

Refine Search

Search Results -

Terms	Documents
L1 same first same second	34

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- Derwent World Patents Index
- IBM Technical Disclosure Bulletins

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side by side			result set
<i>DB=PGPB,USPT,USOC; PLUR=YES; OP=OR</i>			
<u>L2</u>	L1 same first same second	34	<u>L2</u>
<u>L1</u>	DMA near10 ASIC	314	<u>L1</u>

END OF SEARCH HISTORY

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Terms	Documents
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- US Patents Full-Text Database
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<i>DB=EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=OR</i>			
<u>L3</u>	L2	0	<u>L3</u>
<i>DB=PGPB,USPT,USOC; PLUR=YES; OP=OR</i>			
<u>L2</u>	L1 same first same second	34	<u>L2</u>
<u>L1</u>	DMA near10 ASIC	314	<u>L1</u>

END OF SEARCH HISTORY

Refine Search

Search Results -

Terms	Documents
(709/208 709/212 710/22 710/300 710/308 710/72 710/74 710/240 710/241 710/113 711/100 711/202).ccls.	6469

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Search:

L1

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Search History

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L1 710/22,300,308,72,74,240,241,113;711/100,202;709/208,212.ccls.

Hit Count Set Name

result set

6469 L1

END OF SEARCH HISTORY

Refine Search

Search Results -

Terms	Documents
L1 and L2	32

Database:

- US Pre-Grant Publication Full-Text Database
- US Patents Full-Text Database
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Search:

L3

Refine Search

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side by side

DB=PGPB,USPT,USOC; PLUR=YES; OP=OR

- L3 l1 and L2
- L2 DMA near10 ASIC
- L1 710/22,300,308,72,74,240,241,113;711/100,202;709/208,212.ccls.

Hit Count Set Name

result set

- 32 L3
- 314 L2
- 6469 L1

END OF SEARCH HISTORY

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EAST - [Untitled1:1]

File View Edit Tools Window Help

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 L1: (964) "first integr
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ll same (DMA or "direct memory access")

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	U	I	Document ID	Issue Dat	Pages	Title	Current OR	Current XR
1	<input type="checkbox"/>	<input type="checkbox"/>	US 6798418	20040928	16	Graphics subsystem including a RAMDAC IC w	345/519	
2	<input type="checkbox"/>	<input type="checkbox"/>	US 6044414	20000328	25	System for preventing a DMA controller from eva	710/22	700/3;
3	<input type="checkbox"/>	<input type="checkbox"/>	US 6032213	20000229	25	PC core logic chipset comprising a serial reg	710/312	710/241;
4	<input type="checkbox"/>	<input type="checkbox"/>	US 5708849	19980113	12	Implementing scatter/gather operatio	710/22	710/100;



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IEEE JNL. IEEE Journal or Magazine

IEEE JNL. IEEE Journal or Magazine

IEEE CNF. IEEE Conference Proceeding

IEEE CNF. IEEE Conference Proceeding

IEEE STD. IEEE Standard

(dma<in>metadata) <and> (asic<in>metadata)

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Citation



Citation & Abstract

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Article Information



1. ASIC design in a next generation workstation

Young, M.S.;

ASIC Seminar and Exhibit, 1990. Proceedings., Third Annual IEEE 17-21 Sept. 1990 Page(s):P2/6.1 - P2/6.4

[AbstractPlus](#) | Full Text: [PDF](#)(276 KB) IEEE CNF

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Cates, R.L.; Farrell, J.J., III;

Euro ASIC '90

29 May-1 June 1990 Page(s):50 - 55

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3. A floating point convolution system

Panisset, J.F.; Drolet, J.; Cote, J.F.; Larochelle, F.; Malowany, A.S.;

Circuits and Systems, 1990., Proceedings of the 33rd Midwest Symposium on 12-14 Aug. 1990 Page(s):397 - 400 vol.1

[AbstractPlus](#) | Full Text: [PDF](#)(380 KB) IEEE CNF

4. Thoughts on core integration and test

Anderson, T.L.;

Test Conference, 1997. Proceedings., International

1-6 Nov. 1997 Page(s):1039

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5. Design and implementation of an ATM segmentation engine with PCI interface

Chan Kim; Jong-Arm Jun; Kyou-Ho Lee; Hyup-Jong Kim;

Circuits and Systems, 1998. ISCAS '98. Proceedings of the 1998 IEEE International Symposium on Volume 6, 31 May-3 June 1998 Page(s):510 - 513 vol.6

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6. ASIC design of a microcontroller with power management unit

Seung-II Sonh; Hun-Mo Yang; Jong-Ick Lee; Moon-Key Lee;

Semiconductor Conference, 1998. CAS '98 Proceedings. 1998 International Volume 1, 6-10 Oct. 1998 Page(s):159 - 162 vol.1

[AbstractPlus](#) | Full Text: [PDF](#)(352 KB) IEEE CNF

7. Control and communication performance analysis of embedded DSP systems in the MASIC methodology

Deb, A.K.; Oberg, J.; Jantsch, A.;

System Synthesis, 2001. Proceedings. The 14th International Symposium on 2001 Page(s):274 - 279

[AbstractPlus](#) | Full Text: [PDF](#)(1120 KB) [IEEE CNF](#)



8. Design of a multichip module containing a 12 Way S/390 microprocessor subsystem

Kohler, H.;

ASIC Conference and Exhibit, 1996. Proceedings., Ninth Annual IEEE International
23-27 Sept. 1996 Page(s):187 - 190

[AbstractPlus](#) | Full Text: [PDF](#)(336 KB) [IEEE CNF](#)



9. Design and verification of an embedded microprocessor

Onufryk, P.Z.;

Industrial Technology, 1996. (ICIT '96), Proceedings of The IEEE International Conference on
2-6 Dec. 1996 Page(s):786 - 790

[AbstractPlus](#) | Full Text: [PDF](#)(584 KB) [IEEE CNF](#)



10. The APIC approach to high performance network interface design: protected DMA and other techniques

Dittia, Z.D.; Parulkar, G.M.; Cox, J.R., Jr.;

INFOCOM '97. Sixteenth Annual Joint Conference of the IEEE Computer and Communications Societies. Proceedings IEEE
Volume 2, 7-11 April 1997 Page(s):823 - 831 vol.2

[AbstractPlus](#) | Full Text: [PDF](#)(1268 KB) [IEEE CNF](#)



11. The ManArray™ embedded processor architecture

Pechanek, G.G.; Vassiliadis, S.;

Euromicro Conference, 2000. Proceedings of the 26th
Volume 1, 5-7 Sept. 2000 Page(s):348 - 355 vol.1

[AbstractPlus](#) | Full Text: [PDF](#)(548 KB) [IEEE CNF](#)



12. Embedded DRAM built in self test and methodology for test insertion

Jakobsen, P.; Dreibelbis, J.; Pomichter, G.; Anand, D.; Barth, J.; Nelms, M.; Leach, J.; Belansek, G.;

Test Conference, 2001. Proceedings. International
30 Oct.-1 Nov. 2001 Page(s):975 - 984

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ASIC design in a next generation workstation

YOUNG, M.S.

Sun Microsystems Inc., Mountain View, CA, USA;

This paper appears in: **ASIC Seminar and Exhibit, 1990. Proceedings., Third Annual IEEE**

Publication Date: 17-21 Sept. 1990

On page(s): P2/6.1 - P2/6.4

Meeting Date: 09/17/1990 - 09/21/1990

Location: Rochester, NY

INSPREC Accession Number: 4111835

DOI: 10.1109/ASIC.1990.186100

Posted online: 2002-08-06 17:34:54.0

Abstract

The activities of the design team formed for development of a follow-on machine to the Sparcstation 1 are discussed. The design team partitioned the design into four chips: the cache controller (CACHE+), memory management unit (MMU+), direct memory access (DMA+), and dynamic memory controller (RAM+). Architectural changes and higher integration eliminated two of the ASICs used on the Sparcstation 1 and dropped the usage of one of the ASICs from two to one part per board. One ASIC, a video controller, was reused. The manpower requirements of the project and the design/verification tools used by the design team are discussed.

Index Terms

Inspec

Controlled Indexing

CMOS integrated circuits VLSI application specific integrated circuits buffer storage circuit CAD design
 engineering file organisation storage management chips workstations

Non-controlled Indexing

ASIC design CACHE+ DMA+ MMU+ RAM+ cache controller design/verification tools direct memory access
 dynamic memory controller follow-on machine higher integration manpower requirements memory management
 unit new Sparcstation next generation workstation video controller

Author Keywords

Not Available

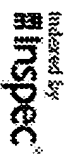
References

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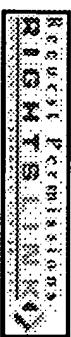
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Design and verification of an embedded microprocessor

Chutruk, P.Z.

AT&T Bell Labs, Res., Murray Hill, NJ, USA.

This paper appears in: **Industrial Technology, 1996. (ICIT 96), Proceedings of The IEEE International Conference on**
Publication Date: 2-6 Dec. 1996

On page(s): 786 - 790

Number of Pages: xv+884

Meeting Date: 12/02/1996 - 12/06/1996

Location: Shanghai

INSPEC Accession Number: 5623104

DOI: 10.1109/ICIT.1996.601705

Posted online: 2002-08-06 20:20:06.0

Abstract

Advances in VLSI technologies are enabling the construction of entire systems on a chip. A major challenge in the design of such systems is design verification. This paper presents the design and verification process used to develop Euphony. Euphony is an inexpensive low power system on a chip which contains: a RISC processor with DSP functions, a complex memory and device controller, two ATM network interfaces, architectural support for AAL5 SAR processing, a five channel DMA controller, and a serial port that can interface to wide variety of audio devices. Euphony was developed jointly by AT&T and LSI Logic. AT&T developed the architecture while LSI Logic performed the implementation using LSI Logic's LCB500K 0.5 micron drawn cell-based ASIC processes. Both companies were heavily involved in design verification.

index Terms
Inspec

Controlled Indexing

VLSI asynchronous transfer mode computer testing digital signal processing chips integrated circuit design
integrated circuit testing logic CAD real-time systems reduced instruction set computing

Non-controlled Indexing

AAL5 SAR processing A&T I ATM network interfaces DMA controller DSP functions Euphony LSI Logic RISC
processor VLSI embedded microprocessor function verification signal processing system on chip

Author Keywords

Not Available

References

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L2: Entry 27 of 34

File: USPT

Dec 17, 1996

DOCUMENT-IDENTIFIER: US 5586291 A

TITLE: Disk controller with volatile and non-volatile cache memories

Detailed Description Text (26):

Cache memory control circuit 40 may be provided as a cache memory control application specific integrated circuit (ASIC) which controls both the SIMMs 32' and the NVSIMMs 34'. It is understood that although cache memory control circuit 40 is here described as a single ASIC in some embodiments it may be desirable to provide control circuit 40 as two or more separate ASICs. For example a first ASIC could direct address control and a second different ASIC could direct data and error control. Suffice it to say that the cache memory control circuit 40 may perform a variety of control functions including but not limited to cache control and DMA control and that each of such functions may be performed by one or more ASICs. For example, a DMA ASIC could control DMA transfers between the NVSIMMs and the volatile SIMMs.

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L2: Entry 27 of 34

File: USPT

Dec 17, 1996

US-PAT-NO: 5586291

DOCUMENT-IDENTIFIER: US 5586291 A

TITLE: Disk controller with volatile and non-volatile cache memories

DATE-ISSUED: December 17, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Lasker; Jeffrey M.	Marlboro	MA		
McGillis; James M.	Franklin	MA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
EMC Corporation	Hopkinton	MA			02

APPL-NO: 08/ 363298 [\[PALM\]](#)

DATE FILED: December 23, 1994

INT-CL: [06] [G06 F 13/00](#)

US-CL-ISSUED: 395/440; 395/492

US-CL-CURRENT: [711/113](#); [711/165](#)

FIELD-OF-SEARCH: 395/440, 395/492, 395/842, 395/873, 395/876

PRIOR-ART-DISCLOSED:

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<input type="checkbox"/>	4392200	July 1983	Arulpragasam et al.	395/467
<input type="checkbox"/>	4439829	March 1984	Tsiang	395/445
<input type="checkbox"/>	4755930	July 1988	Wilson, Jr. et al.	395/449
<input type="checkbox"/>	4794524	December 1988	Carberry et al.	395/375
<input type="checkbox"/>	4831581	May 1989	Rubinfeld	395/250
<input type="checkbox"/>	4885680	December 1989	Anthony et al.	364/471
<input type="checkbox"/>	4888689	December 1989	Taylor et al.	364/467
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<input type="checkbox"/> 5163142	November 1992	Mageau	395/469
<input type="checkbox"/> 5170476	December 1992	Laakso et al.	395/467
<input type="checkbox"/> 5193166	March 1993	Menasce	395/447
<input type="checkbox"/> 5257352	October 1993	Yamamoto et al.	395/463
<input type="checkbox"/> 5274787	December 1993	Hirano et al.	395/470
<input type="checkbox"/> 5276833	January 1994	Auvinen et al.	395/432
<input type="checkbox"/> 5287473	February 1994	Mohan et al.	395/460
<input type="checkbox"/> 5303362	April 1994	Butts, Jr. et al.	395/448
<input type="checkbox"/> 5347642	September 1994	Barratt	395/440
<input type="checkbox"/> 5349651	September 1984	Hetherington et al.	395/417

ART-UNIT: 238

PRIMARY-EXAMINER: Robertson; David L.

ATTY-AGENT-FIRM: Weingarten, Schurgin, Gagnebin & Hayes LLP

ABSTRACT:

A disk storage subsystem includes both volatile and non-volatile portions of memory. In response to a write command from a host computer, the controller allocates a predetermined number of memory blocks in the non-volatile cache memory and allocates a corresponding number of blocks in the volatile memory. Host supplied write data is then stored in the allocated non-volatile memory blocks. The data may also be mirrored in additional non-volatile memory. Immediately thereafter the subsystem sends an acknowledge signal to the host. The subsystem then performs a DMA operation to copy the write-data from the non-volatile memory blocks to the volatile memory blocks. The write-data is then stored on a disk drive at which point the non-volatile memory may be de-allocated. Subsequent reads of the given data may be read from the volatile memory, reducing disk access time. In the event of a power failure, data stored in the non-volatile memory but not yet written to disk is preserved. In the event of a disk controller failure, the non-volatile memory modules may be transferred to a functioning disk controller for recovery.

23 Claims, 9 Drawing figures

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L2: Entry 26 of 34

File: USPT

Sep 1, 1998

DOCUMENT-IDENTIFIER: US 5802327 A

TITLE: Device for SCSI expansion

Detailed Description Text (15):

DMA controller 216 is coupled to first SCSI bus 208 and second SCSI bus 209. DMA controller 216 can be an ASIC or other circuitry or device. DMA controller 216 can be a single chip or can comprise a plurality of chips. DMA controller 216 is coupled to SCSI bus 208 and SCSI bus 209. DMA controller 216 allows DMA data transfer between a first SCSI peripheral coupled to first SCSI bus 208 and a computer system coupled to second SCSI bus 209. A DMA file transfer can be accomplished by transmitting a starting address from the computer system on SCSI bus 209 for the data transfer, transmitting byte count information for the data transfer and transmitting the data. Likewise, a DMA data transfer can be accomplished in the other direction by transmitting a starting address from the SCSI device on SCSI bus 208, transmitting byte count information for the data transfer and transmitting the data.

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L2: Entry 26 of 34

File: USPT

Sep 1, 1998

US-PAT-NO: 5802327

DOCUMENT-IDENTIFIER: US 5802327 A

TITLE: Device for SCSI expansion

DATE-ISSUED: September 1, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hawley; Brian N.	Riverside	CA		
Saunders; Michael C.	Riverside	CA		
Tolsma; Arthur R.	Redlands	CA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Luminex Software Incorporated	Riverside	CA			02

APPL-NO: 08/ 558961 [\[PALM\]](#)

DATE FILED: November 13, 1995

INT-CL: [06] [G06 F 1/00](#)

US-CL-ISSUED: 395/281; 395/822, 395/823, 395/308

US-CL-CURRENT: [710/300](#); [710/2](#), [710/3](#)

FIELD-OF-SEARCH: 395/281, 395/842, 395/306, 395/308, 395/822, 395/823

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

☐ Search Selected☐ Search All☐ Clear

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	5202979	April 1993	Hillis et al.	395/575
<input type="checkbox"/>	5239632	August 1993	Larner	395/325
<input type="checkbox"/>	5274783	December 1993	House et al.	395/325
<input type="checkbox"/>	5564026	October 1996	Amini et.al.	395/308

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Company Introduction of Intaglio, Intaglio, 5 pps., (Feb. 1995).

CDM-4000 Quad-Speed CD Mastering System Data Specification, Dynatek Structured For Storage, 2 pps., (Nov. 1994).

CD Studio Specification Document, Young Minds, Inc., 4 pps., (1994).

ART-UNIT: 235

PRIMARY-EXAMINER: Harvey; Jack B.

ASSISTANT-EXAMINER: Pancholi; Jigar

ATTY-AGENT-FIRM: Blakely Sokoloff Taylor & Zafman

ABSTRACT:

A SCSI expansion device receives a first SCSI identifier and logical unit number from a first SCSI bus for identifying a first SCSI peripheral. The SCSI expansion device converts the first SCSI identifier and logical unit number to a second SCSI identifier and logical unit number and represents the first SCSI peripheral to external devices coupled to a second SCSI bus with the second SCSI identifier and logical unit number.

15 Claims, 11 Drawing figures

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L2: Entry 17 of 34

File: USPT

Mar 16, 2004

DOCUMENT-IDENTIFIER: US 6708285 B2

TITLE: Redundant controller data storage system having system and method for handling controller resets

Detailed Description Text (10):

In one preferred embodiment, the task processor 52 operates to copy the memory image of first mirrored memory 50 to second memory 56 while the system operation processor 54 continues to process system operation commands. As such, hot insertion of the second controller 34 into the redundant controller system 30 does not result in undo delay to the processing of system operation commands and/or a timeout by a host system via host system interface 42. In one exemplary embodiment, task processor 52 performs background tasks without direct involvement of system operation processor 54 or other system processors, via specialized data processing hardware. In one aspect, the data processing hardware is coupled to an intelligent DMA engine, as part of an application specific integrated circuit (ASIC). Task processor 52 has the ability to process specific background tasks during continued operation of the first controller 32 via system operation processor 50. In one aspect, task processor 52 operates to perform a memory-to-memory copy task, a memory self-test, as well as other tasks.

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L2: Entry 17 of 34

File: USPT

Mar 16, 2004

US-PAT-NO: 6708285

DOCUMENT-IDENTIFIER: US 6708285 B2

TITLE: Redundant controller data storage system having system and method for handling controller resets

DATE-ISSUED: March 16, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Oldfield; Barry J.	Boise	ID		
Johansson; Christopher W.	Horseshoe Bend	ID		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Hewlett-Packard Development Company, L.P.	Houston	TX			02

APPL-NO: 09/ 810108 [\[PALM\]](#)

DATE FILED: March 15, 2001

PARENT-CASE:

CROSS REFERENCE TO RELATED APPLICATIONS This Non-Provisional Patent Application is related to commonly assigned U.S. patent application Ser. No. 09/810,103, filed on Mar. 15, 2001, entitled "Redundant Controller Data Storage System Having On-Line Controller Removal System and Method," which is incorporated herein by reference; and U.S. patent application Ser. No. 09/810,102, filed on Mar. 15, 2001, entitled "Redundant Controller Data Storage System Having Fast Insertion System and Method," which is incorporated herein by reference.

INT-CL: [07] [G06 F 11/00](#)

US-CL-ISSUED: 714/11

US-CL-CURRENT: [714/11](#)

FIELD-OF-SEARCH: 714/6, 714/7, 714/8, 714/9, 714/11, 714/12, 714/23, 714/24, 710/302

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

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<input type="checkbox"/>	5155835	October 1992	Belsan	
<input type="checkbox"/>	5155845	October 1992	Beal et al.	
<input type="checkbox"/>	5193154	March 1993	Kitajima et al.	

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<input type="checkbox"/> <u>5699510</u>	December 1997	Petersen et al.	
<input type="checkbox"/> <u>5856989</u>	January 1999	Oldfield et al.	
<input type="checkbox"/> <u>5915082</u>	June 1999	Marshall et al.	714/11
<input type="checkbox"/> <u>5928367</u>	July 1999	Nelson et al.	
<input type="checkbox"/> <u>5960451</u>	September 1999	Voigt et al.	
<input type="checkbox"/> <u>6085332</u>	July 2000	El-Batal	
<input type="checkbox"/> <u>6092168</u>	July 2000	Voigt	
<input type="checkbox"/> <u>6138247</u>	October 2000	McKay et al.	714/10
<input type="checkbox"/> <u>6327675</u>	December 2001	Burdett et al.	714/11

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO
4364514

PUBN-DATE
December 1992

COUNTRY
JP

US-CL

ART-UNIT: 2184

PRIMARY-EXAMINER: Beausoliel; Robert

ASSISTANT-EXAMINER: Bonzo; Bryce P.

ABSTRACT:

A redundant controller data storage system having a system and method for handling controller resets is described. In one aspect, the method of handling a controller reset in a redundant controller system according to the present invention includes the redundant controller system having a first controller and a second controller. A controller reset is detected on the second controller. The first controller is notified of the controller reset via a communication link between the first controller and the second controller. A shutdown process on the first controller and the second controller is performed. The communication link between the first controller and the second controller is disabled, wherein detection of a subsequent controller reset via the second controller cannot be communicated to the first controller via the communication link.

17 Claims, 13 Drawing figures

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Refine Search

Search Results -

Terms	Documents
DMA same (first adj1 (IC or "integrated circuit")) same (second adj1 (IC or "integrated circuit"))	7

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L2	L1 same first same second	34	L2
L1	DMA near10 ASIC	314	L1

END OF SEARCH HISTORY

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<u>L1</u> DMA near10 ASIC	314	<u>L1</u>

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L5: Entry 4 of 7

File: USPT

Sep 28, 2004

DOCUMENT-IDENTIFIER: US 6798418 B1

TITLE: Graphics subsystem including a RAMDAC IC with digital video storage interface for connection to a graphics bus

Brief Summary Text (15):

In one embodiment, a graphics processor implemented on a first integrated circuit chip is configured to render digital image information in response to graphics commands and to store the digital image information in a memory. The graphics commands may be received, for example, from a main CPU within a computer system associated with the graphics subsystem. A conversion unit is further provided on a second integrated circuit chip, which includes a color mapping unit and a digital-to-analog converter. The color mapping unit may include a RAM look-up table and is configured to convert the digital image information into digital RGB display data. The digital-to-analog converter is coupled to convert the digital RGB display data into one or more analog signals for driving a video display. The graphics subsystem further includes a Direct Memory Access (DMA) controller implemented on the second integrated circuit chip. The DMA controller is configured to generate read requests to retrieve the digital image information stored in the memory and to thereby cause the digital image information to be provided to the conversion unit. The DMA controller is further configured to generate write cycles to cause the digital RGB display data to be written to a designated region of memory. The operating system may then transfer the digital RGB display data from the memory into a storage device such as a hard disk drive.

CLAIMS:

1. A graphics subsystem comprising: a graphics processor implemented on a first integrated circuit chip, wherein said graphics processor is configured to render digital image information in response to a graphics command received from a CPU and to store said digital image information in a memory; a conversion unit implemented on a second integrated circuit chip, wherein said conversion unit includes a color mapping unit coupled to convert said digital image information to digital RGB display data, wherein said conversion unit further includes a digital-to-analog converter coupled to convert said digital RGB display data to one or more analog signals for driving a video display; and a DMA controller implemented on said second integrated circuit chip, wherein said DMA controller is configured to generate read requests to retrieve said digital image information stored in said memory and to cause said digital image information to be provided to said conversion unit; wherein said DMA controller is further configured to generate write cycles to cause said digital RGB display data to be written to a designated memory region.

18. A computer system comprising: a CPU; a graphics subsystem coupled to said CPU including: a graphics processor implemented on a first integrated circuit chip, wherein said graphics processor is configured to render digital image information in response to a graphics command received from said CPU and to store said digital image information in a first memory; a conversion unit implemented on a second integrated circuit chip, wherein said conversion unit includes a color mapping unit coupled to convert said digital image information to digital RGB display data, wherein said conversion unit further includes a digital-to-analog converter coupled to convert said digital RGB display data to one or more analog signals for driving a video display; and a DMA controller implemented on said second integrated circuit chip, wherein said DMA controller is configured to generate read requests to retrieve said digital image information stored in said first memory and to cause said digital image information to be provided to said conversion unit; wherein said DMA controller is further configured to generate write cycles to cause said digital RGB display data to be written to a designated memory region.

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L5: Entry 4 of 7

File: USPT

Sep 28, 2004

US-PAT-NO: 6798418

DOCUMENT-IDENTIFIER: US 6798418 B1

TITLE: Graphics subsystem including a RAMDAC IC with digital video storage interface for connection to a graphics bus

DATE-ISSUED: September 28, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sartori; Gabriele	Fremont	CA		
Gulick; Dale E.	Austin	TX		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Advanced Micro Devices, Inc.	Sunnyvale	CA			02

APPL-NO: 09/ 577527 [\[PALM\]](#)

DATE FILED: May 24, 2000

INT-CL: [07] [G06 F 13/14](#)

US-CL-ISSUED: 345/519

US-CL-CURRENT: [345/519](#)

FIELD-OF-SEARCH: 375/240, 375/240.27, 345/509, 345/643, 345/519, 345/506, 345/558, 345/420, 345/419, 345/501, 345/522, 345/520, 326/38, 710/26, 710/312, 710/305, 710/200, 710/56, 710/22, 710/52, 701/208, 711/147, 370/263

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

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<input type="checkbox"/>	5099331	March 1992	Truong	
<input type="checkbox"/>	5798770	August 1998	Baldwin	
<input type="checkbox"/>	5821918	October 1998	Reinert et al.	345/643
<input type="checkbox"/>	6008821	December 1999	Bright et al.	
<input type="checkbox"/>	6020901	February 2000	Lavelle et al.	345/509
<input type="checkbox"/>	6091778	July 2000	Sporer et al.	375/240
<input type="checkbox"/>	6145025	November 2000	Lim	710/22
<input type="checkbox"/>	6201834	March 2001	Zhu	375/240.27

<input type="checkbox"/> 6219725	April 2001	Diehl et al.	710/26
<input type="checkbox"/> 6433579	August 2002	Wang et al.	326/38
<input type="checkbox"/> 6442477	August 2002	Okada	701/208

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FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
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WO 00/28518	May 2000	WO	

OTHER PUBLICATIONS

Specification for ADV478/ADV471, Analog Devices, Inc., pp. 1-12.

ART-UNIT: 2676

PRIMARY-EXAMINER: Bella; Matthew C.

ASSISTANT-EXAMINER: Singh; Dalip K.

ATTY-AGENT-FIRM: Meyertons Hood Kivlin Kower & Goetzel, P.C. Kivlin; B. Noel Curran; Stephen J.

ABSTRACT:

A graphics subsystem including a RAMDAC for connection to a graphics bus implemented on an integrated circuit chip separate from a graphics processor. In one embodiment, the graphics processor is configured to render digital image information in response to graphics commands and to store the digital image information in a memory. The RAMDAC IC includes a conversion unit, which includes a color mapping unit and a digital-to-analog converter and is configured to convert a representation of the digital image information into one or more analog signals for driving a video display. The graphics subsystem further includes a Direct Memory Access (DMA) controller implemented on the second integrated circuit chip. The DMA controller is configured to generate read requests to retrieve the digital image information stored in the memory to thereby cause the digital image information to be provided to the conversion unit. The DMA controller is further configured to generate write cycles to cause digital RGB display data received from the color mapping unit, in the conversion unit, to be provided for storage in a specified region of memory. In another embodiment, the graphics subsystem may include a digital video interface implemented on the second integrated circuit chip. The digital video interface is configured to receive digital RGB display data from the color mapping unit and to provide an encoded digital video output to a digital video output port. The digital video interface is further configured to receive encoded digital video from a digital video input port and to provide decoded digital display data for storage on devices such as a digital VCR.

36 Claims, 9 Drawing figures

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L5: Entry 5 of 7

File: USPT

Mar 28, 2000

DOCUMENT-IDENTIFIER: US 6044414 A

TITLE: System for preventing a DMA controller from evaluating its DRQ input once a DMA operation has started until the DRQ input has been updated

Abstract Text (1):

A computer system includes first and second integrated circuits. A direct memory access (DMA) controller circuit on the first integrated circuit receives a direct memory access request (DRQ) input signal which is provided from the second integrated circuit, across a signal line of said bus. The value of the DRQ signal is updated at predetermined intervals on the signal line. A DMA synchronization control circuit on the first integrated circuit prevents the DMA controller circuit from evaluating its DRQ input signal, once a DMA operation has started, until after the value of the DRQ input signal has been updated by the second integrated circuit. In addition, the DMA acknowledge signal from the DMA controller circuit is mapped to an address indicative of the acknowledge signal, and the address is sent to the second integrated circuit. A decoder circuit on the second integrated circuit decodes the address and provides the appropriate DMA acknowledge signal to a functional block on the second integrated circuit according to the address received.

Brief Summary Text (15):

One problem associated with such a solution is to ensure that direct memory access information provided to the first integrated circuit is valid. Because of the inherent delay of a serial bus, such information may be invalid when the DMA control circuit expects the information to be valid. Accordingly, the present invention provides a computer system including a first and second integrated circuits which are coupled by a serial bus. A direct memory access (DMA) circuit is on the first integrated circuit and coupled to receive a direct memory access request (DRQ) input signal from the second integrated circuit. The value of the DRQ signal is provided from said second integrated circuit, across a signal line of the bus with the value being updated periodically the signal line;

Brief Summary Text (16):

Accordingly, a DMA synchronization control circuit on the first integrated circuit, prevents the DMA circuit from evaluating its DRQ input signal until after the DRQ input signal has been updated by said second integrated circuit after a DMA operation. In addition, the DMA acknowledge signal from the DMA controller circuit is mapped to an address indicative of the acknowledge signal, and the address is sent to the second integrated circuit. A decoder circuit on the second integrated circuit decodes the address and provides the appropriate DMA acknowledge signal according to the address received.

CLAIMS:

1. A computer system including a first and a second integrated circuit, coupled by a bus, comprising:

a direct memory access (DMA) controller circuit disposed on said first integrated circuit and coupled to receive a direct memory access (DMA) request (DRQ) signal, a value of said DRQ signal being provided from said second integrated circuit, across a signal line of said bus, said value being updated at a predetermined interval on said signal line;

a DMA synchronization control circuit disposed on said first integrated circuit, said DMA synchronization control circuit preventing said DMA controller circuit from evaluating said DRQ signal until after said DRQ signal has been updated by said second integrated circuit after a DMA operation has completed.

4. The computer system as recited in claim 3, wherein said DMA controller circuit disposed on said first integrated circuit is responsive to a first and a second DMA request signal to provide respectively a first and second DMA acknowledge signal, and wherein said first integrated circuit further includes an address circuit coupled to receive said first and second DMA request signals, said address circuit for mapping said first DMA acknowledge signal to a first address and the second DMA acknowledge signal to a second address, said first integrated circuit coupled to selectably provide one of said first and second addresses to said second integrated circuit across said bus according to which of said first and second DMA acknowledge signals is asserted.

13. A method of operating a computer system including a first and a second integrated circuit, coupled by a bus, comprising:

providing from said second integrated circuit, across a signal line of said bus, an asserted direct memory access (DMA) request indication to said first integrated circuit, thereby indicating that a functional circuit block on said second integrated circuit is requesting a direct memory access (DMA) operation;

providing said asserted direct memory access request indication to a direct memory request (DRQ) input of a direct memory access (DMA) controller circuit disposed on said first integrated circuit;

after a start of a DMA operation responsive to said asserted DMA request indication, prohibiting said direct memory access controller circuit from evaluating said DRQ input until after said functional circuit block has received control information related to said direct memory access operation and has provided said direct memory access circuit with an updated direct memory access request indication in response.

17. A method for operating a computer system including a first and a second integrated circuit coupled by a bus, said first integrated circuit including a direct memory access (DMA) controller circuit receiving a first direct memory access request (DRQ) signal, said second integrated circuit including a first functional block receiving a local direct memory access acknowledge signal and providing a direct memory access request signal;

sending said direct memory access request (DRQ) signal, provided from said first functional block on said second integrated circuit to said DMA controller circuit on said first integrated circuit over a signal line of said bus;

providing a DMA acknowledge signal, as part of a DMA operation responsive to said DRQ signal, from said DMA controller circuit to an address circuit on said first functional block;

mapping said DMA acknowledge signal to an address corresponding to said DMA acknowledge signal; and

sending said address to said second integrated circuit.

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File: USPT

Mar 28, 2000

US-PAT-NO: 6044414

DOCUMENT-IDENTIFIER: US 6044414 A

TITLE: System for preventing a DMA controller from evaluating its DRQ input once a DMA operation has started until the DRQ input has been updated

DATE-ISSUED: March 28, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Gulick; Dale E.	Austin	TX		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Advanced Micro Devices, Inc.	Sunnyvale	CA			02

APPL-NO: 09/ 024293 [\[PALM\]](#)

DATE FILED: February 17, 1998

PARENT-CASE:

CROSS REFERENCE TO RELATED APPLICATIONS This application relates to the following co-pending application entitled "PC CORE LOGIC SERIAL REGISTER ACCESS BUS", Ser. No. 08/928,035, still pending filed Sep. 11, 1997, by Dale E. Gulick; which application is incorporated herein by reference.

INT-CL: [07] [G06 F 13/14](#)

US-CL-ISSUED: 710/22; 710/241, 710/266, 364/132

US-CL-CURRENT: [710/22](#); [700/3](#), [710/241](#), [710/266](#)

FIELD-OF-SEARCH: 710/21, 710/22, 710/113, 710/241, 710/260, 364/132

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

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	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
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<input type="checkbox"/>	5373493	December 1994	Iizuka	369/124
<input type="checkbox"/>	5410542	April 1995	Gerbehy et al.	370/85.1
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<input type="checkbox"/>	5740387	April 1998	Lambrecht et al.	395/309

<input type="checkbox"/> <u>5778252</u>	July 1998	Sangveraphunsiri et al.	710/21
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<input type="checkbox"/> <u>5894578</u>	April 1999	Qureshi et al.	710/266
<input type="checkbox"/> <u>5941976</u>	August 1999	Gulick	710/260

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Common Architecture, "Desktop PC/AT systems", Mar. 21, 1996, Version .93 Preliminary, pp. 1-26.

Advanced Micro Devices, "AM7968/Am7969 TAXIchip.TM. Article Reprints", Jan. 22, 1987, pp. 1-77, particularly pp. 67-72.

National Semiconductor, "PC87306 SuperI/O.TM. Enhanced Sidewinder Lite Floppy Disk Controller, Keyboard Controller, Real-Time Clock, Dual UART's, Infrared Interface, IEEE 1284 Parallel Port, and IDE Interface", Preliminary--Nov. 1995, pp. 1-110.

Shanley and Anderson, "ISA System Architecture", MindShare Press, Richardson, TX, 1991 and 1993, pp. 367-388.

Messmer, "The Indispensable PC Hardware Book--Your Hardware Questions Answered Second Edition", Addison Wesley Longman Limited, Harlow England, 1995, pp. 598-621.

Intel, "Low Pin Count (LPC) Interface Specification", Revision 1.0, Intel Corporation, 1997, pp. 1-31.

Harris Semiconductor, "CMOS High Performance Programmable DMA Controller", Harris Corporation, Mar. 1997, pp. 4-192 to 4-214.

ART-UNIT: 272

PRIMARY-EXAMINER: Lee; Thomas C.

ASSISTANT-EXAMINER: Elamin; Abdelmoniem

ATTY-AGENT-FIRM: Zagorin, O'Brien & Graham, LLP

ABSTRACT:

A computer system includes first and second integrated circuits. A direct memory access (DMA) controller circuit on the first integrated circuit receives a direct memory access request (DRQ) input signal which is provided from the second integrated circuit, across a signal line of said bus. The value of the DRQ signal is updated at predetermined intervals on the signal line. A DMA synchronization control circuit on the first integrated circuit prevents the DMA controller circuit from evaluating its DRQ input signal, once a DMA operation has started, until after the value of the DRQ input signal has been updated by the second integrated circuit. In addition, the DMA acknowledge signal from the DMA controller circuit is mapped to an address indicative of the acknowledge signal, and the address is sent to the second integrated circuit. A decoder circuit on the second integrated circuit decodes the address and provides the appropriate DMA acknowledge signal to a functional block on the second integrated circuit according to the address received.

23 Claims, 17 Drawing figures

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L5: Entry 6 of 7

File: USPT

Feb 29, 2000

DOCUMENT-IDENTIFIER: US 6032213 A

**** See image for Certificate of Correction ****

TITLE: PC core logic chipset comprising a serial register access bus

CLAIMS:

26. The method as recited in claim 17 further comprising providing to a DMA request line at least one DMA request bit, said one DMA request bit indicating a state of a DMA request from a first functional block in the second integrated circuit to a DMA controller on the first integrated circuit.

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L5: Entry 6 of 7

File: USPT

Feb 29, 2000

US-PAT-NO: 6032213

DOCUMENT-IDENTIFIER: US 6032213 A

**** See image for Certificate of Correction ****

TITLE: PC core logic chipset comprising a serial register access bus

DATE-ISSUED: February 29, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Gulick; Dale E.	Austin	TX		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Advanced Micro Devices, Inc.	Sunnyvale	CA			02

APPL-NO: 08/ 928035 [PALM]

DATE FILED: September 11, 1997

PARENT-CASE:

CROSS REFERENCE TO RELATED APPLICATIONS This application relates to the following applications: Ser. No. 08/802,321, filed Feb. 18, 1997, entitled "SYSTEM FOR PARTITIONING PC CHIPSET FUNCTIONS INTO LOGIC AND PORT INTEGRATED CIRCUITS", by Dale E. Gulick; Ser. No. 08/802,323, now U.S. Pat. No. 5,926,629, filed Feb. 18, 1997, entitled "CONTINUOUSLY OPERATING INTERCONNECTION BUS", by Dale E. Gulick; Ser. No. 08/928,034, filed the same day as the present application, entitled "PC CHIPSET WITH USER CONFIGURABLE PROGRAMMABLE LOGIC STRUCTURE", by Dale E. Gulick; and Ser. No. 08/929,153, filed the same day as the present application, entitled "SYSTEM POWER MANAGEMENT PARTITIONED ACROSS A SERIAL BUS", by Dale E. Gulick; all of which applications are incorporated herein by reference.

INT-CL: [07] G06 F 13/00, G06 F 13/42

US-CL-ISSUED: 710/129; 710/2, 710/22, 710/28, 710/100, 710/126, 710/260, 710/266, 712/38, 713/502

US-CL-CURRENT: 710/312; 710/100, 710/2, 710/22, 710/260, 710/266, 710/28, 712/38, 713/502

FIELD-OF-SEARCH: 710/101, 710/129, 710/130, 710/2, 710/28, 710/100, 710/260, 710/266, 710/48, 710/22, 710/61, 710/126, 710/105, 710/106, 712/38, 712/40, 713/400, 713/502

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

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PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
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<input type="checkbox"/> <u>4885538</u>	December 1989	Hoenniger, III et al.	324/312

<input type="checkbox"/> <u>5410542</u>	April 1995	Gerbeby et al.	370/85.1
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<input type="checkbox"/> <u>5841631</u>	November 1998	Shin et al.	361/684
<input type="checkbox"/> <u>5941976</u>	August 1999	Gulick	710/260

OTHER PUBLICATIONS

Intel, "82371FB (PIIX) and 82371SB (PIIX3) PCI ISA IDE Xcelerator", May 1996, pp. 1-118.
Common Architecture, "Desktop PC/AT systems", Mar. 21, 1996, Version .93 Preliminary, pp. 1-26.

Advanced Micro Devices, "AM7968/Am7969 TAXIchip.TM. Article Reprints", Jan. 22, 1987, pp. 1-77, particularly pp. 67-72.

National Semiconductor, "PC87306 SuperI/O.TM. Enhanced Sidewinder Lite Floppy Disk Controller, Keyboard Controller, Real-Time Clock, Dual UARTs, Infrared Interface, IEEE 1284 Parallel Port, and IDE Interface", Preliminary-Nov. 1995, pp. 1-110.

ART-UNIT: 271

PRIMARY-EXAMINER: Thai; Xuan M.

ATTY-AGENT-FIRM: Zagorin, O'Brien & Graham, LLP

ABSTRACT:

A computer system includes first and second integrated circuits. The first integrated circuit provides a first input/output bus operating in accordance with a first protocol, such as ISA. The first input/output bus includes a plurality of address and data lines respectively providing address and data information. The second integrated circuit includes a plurality of second functional blocks at least some of which interface to legacy devices. The first integrated circuit includes a host controller circuit, coupled to the first input/output bus and for coupling to a register access bus which includes a register data out and a register data in signal line. The register access bus connects the first and second integrated circuits. The host controller circuit receives address and data information from the input/output bus and serially provides the address and data information to the data out line. A target controller circuit on the second integrated circuit is coupled to the register access bus. The target controller circuit receives the serially provided address and data information and provides the address and data information, over a second representation of the input/output bus, the second representation being at least a subset of the first protocol and including a plurality of internal address lines and a plurality of internal data lines coupled to the second functional blocks. Write operations take place to memory locations in the second integrated circuit from a write operation begun on the first integrated circuit and read operations take place from memory locations in the second integrated circuit for read operations begun on the first integrated circuit.

36 Claims, 15 Drawing figures

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L5: Entry 6 of 7

File: USPT

Feb 29, 2000

US-PAT-NO: 6032213

DOCUMENT-IDENTIFIER: US 6032213 A

**** See image for Certificate of Correction ****

TITLE: PC core logic chipset comprising a serial register access bus

DATE-ISSUED: February 29, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Gulick; Dale E.	Austin	TX		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Advanced Micro Devices, Inc.	Sunnyvale	CA			02

APPL-NO: 08/ 928035 [PALM]

DATE FILED: September 11, 1997

PARENT-CASE:

CROSS REFERENCE TO RELATED APPLICATIONS This application relates to the following applications: Ser. No. 08/802,321, filed Feb. 18, 1997, entitled "SYSTEM FOR PARTITIONING PC CHIPSET FUNCTIONS INTO LOGIC AND PORT INTEGRATED CIRCUITS", by Dale E. Gulick; Ser. No. 08/802,323, now U.S. Pat. No. 5,926,629, filed Feb. 18, 1997, entitled "CONTINUOUSLY OPERATING INTERCONNECTION BUS", by Dale E. Gulick; Ser. No. 08/928,034, filed the same day as the present application, entitled "PC CHIPSET WITH USER CONFIGURABLE PROGRAMMABLE LOGIC STRUCTURE", by Dale E. Gulick; and Ser. No. 08/929,153, filed the same day as the present application, entitled "SYSTEM POWER MANAGEMENT PARTITIONED ACROSS A SERIAL BUS", by Dale E. Gulick; all of which applications are incorporated herein by reference.

INT-CL: [07] G06 F 13/00, G06 F 13/42

US-CL-ISSUED: 710/129; 710/2, 710/22, 710/28, 710/100, 710/126, 710/260, 710/266, 712/38, 713/502

US-CL-CURRENT: 710/312; 710/100, 710/2, 710/22, 710/260, 710/266, 710/28, 712/38, 713/502

FIELD-OF-SEARCH: 710/101, 710/129, 710/130, 710/2, 710/28, 710/100, 710/260, 710/266, 710/48, 710/22, 710/61, 710/126, 710/105, 710/106, 712/38, 712/40, 713/400, 713/502

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

☐ Search Selected☐ Search ALL☐ Clear

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
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Advanced Micro Devices, "AM7968/Am7969 TAXIchip.TM. Article Reprints", Jan. 22, 1987, pp. 1-77, particularly pp. 67-72.

National Semiconductor, "PC87306 SuperI/O.TM. Enhanced Sidewinder Lite Floppy Disk Controller, Keyboard Controller, Real-Time Clock, Dual UARTs, Infrared Interface, IEEE 1284 Parallel Port, and IDE Interface", Preliminary-Nov. 1995, pp. 1-110.

ART-UNIT: 271

PRIMARY-EXAMINER: Thai; Xuan M.

ATTY-AGENT-FIRM: Zagorin, O'Brien & Graham, LLP

ABSTRACT:

A computer system includes first and second integrated circuits. The first integrated circuit provides a first input/output bus operating in accordance with a first protocol, such as ISA. The first input/output bus includes a plurality of address and data lines respectively providing address and data information. The second integrated circuit includes a plurality of second functional blocks at least some of which interface to legacy devices. The first integrated circuit includes a host controller circuit, coupled to the first input/output bus and for coupling to a register access bus which includes a register data out and a register data in signal line. The register access bus connects the first and second integrated circuits. The host controller circuit receives address and data information from the input/output bus and serially provides the address and data information to the data out line. A target controller circuit on the second integrated circuit is coupled to the register access bus. The target controller circuit receives the serially provided address and data information and provides the address and data information, over a second representation of the input/output bus, the second representation being at least a subset of the first protocol and including a plurality of internal address lines and a plurality of internal data lines coupled to the second functional blocks. Write operations take place to memory locations in the second integrated circuit from a write operation begun on the first integrated circuit and read operations take place from memory locations in the second integrated circuit for read operations begun on the first integrated circuit.

36 Claims, 15 Drawing figures

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L5: Entry 7 of 7

File: USPT

Jan 13, 1998

DOCUMENT-IDENTIFIER: US 5708849 A

TITLE: Implementing scatter/gather operations in a direct memory access device on a personal computer

Detailed Description Text (7):

Also connected to the PCI bus 12 is a PCI/secondary bus bridge circuit 17. The bridge circuit 17 performs the various functions necessary to transfer data between the PCI bus 12 and various component circuits joined to a secondary bus 18. The secondary bus 18 may be an ISA bus or a EISA bus both of which transfer data at rates slower than does the bus 12. One specific PCI to EISA bus bridge circuit 17 is a part of a chip set manufactured by Intel Corporation and referred to as the 82374EB and 82375EB-EISA Bridge. Such a bridge circuit is described in detail in a publication by Intel Corporation entitled 82420/82430 PCIset, ISA and EISA Bridges. Such a bridge circuit 17 includes circuitry for providing the interfaces between the PCI bus 12 and the secondary bus 18 so that data may be transferred therebetween. The bridge circuit 17 is manufactured in one embodiment as a two chip integrated circuit set; a first one of these integrated circuits performs functions related to the PCI bus 12 and a second one of these integrated circuits performs functions related to the secondary (EISA) bus 18. The first integrated circuit provides circuitry which allows the bridge 17 to operate as an intercoupling bus master or a bus slave on the PCI bus 12. The second integrated circuit includes circuitry which allows the bridge 17 to perform bus master or bus slave functions on the secondary (EISA) bus 18. The bridge circuit 17 also includes within the two integrated circuit chips a first arbiter circuit 20 for controlling access to the PCI bus 12 and a second arbiter circuit 21 for controlling access to the secondary bus 18. In one embodiment, the circuitry of the EISA control portion of the bridge circuit 17 includes a DMA device connected as a bus master on the secondary bus 18 which is adapted to provide the advantages of the present invention. The ability of the bridge circuit 17 to act as a PCI bus master and a secondary bus slave allows a bus master circuit 19 positioned on the secondary bus 18 (for example, the DMA circuitry) to gain access to the PCI bus 12 and thence to the main memory. The PCI agents 16 may also gain access to component devices on the secondary bus in a similar manner.

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L5: Entry 7 of 7

File: USPT

Jan 13, 1998

US-PAT-NO: 5708849

DOCUMENT-IDENTIFIER: US 5708849 A

TITLE: Implementing scatter/gather operations in a direct memory access device on a personal computer

DATE-ISSUED: January 13, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Coke; James S.	Cameron Park	CA		
Bhatt; Ajay V.	Eldorado Hills	CA		
Graham; Stan	Cameron Park	CA		
Lent; David	Placerville	CA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Intel Corporation	Santa Clara	CA			02

APPL-NO: 08/ 791008 [\[PALM\]](#)

DATE FILED: January 27, 1997

PARENT-CASE:

This is a continuation of application Ser. No. 08/187,751, filed Jan. 26, 1994, now abandoned.

INT-CL: [06] [G06 F 13/10](#)

US-CL-ISSUED: 395/842; 395/310

US-CL-CURRENT: [710/22](#)

FIELD-OF-SEARCH: 395/842, 395/843, 395/844, 395/845, 395/846, 395/847, 395/848, 395/310

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected

Search ALL

Clear

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	5155830	October 1992	Kurashige	395/844
<input type="checkbox"/>	5175825	December 1992	Starr	395/425
<input type="checkbox"/>	5182800	January 1993	Farrell et al.	395/844
<input type="checkbox"/>	5212795	May 1993	Hendry	395/848
<input type="checkbox"/>	5251303	October 1993	Fogg, Jr. et al.	395/844

<input type="checkbox"/> <u>5291582</u>	March 1994	Drako et al.	395/425
<input type="checkbox"/> <u>5333290</u>	July 1994	Kato	395/846
<input type="checkbox"/> <u>5333294</u>	July 1994	Schnell	395/846
<input type="checkbox"/> <u>5367639</u>	November 1994	Sodos	395/844

ART-UNIT: 232

PRIMARY-EXAMINER: Chan; Eddie P.

ASSISTANT-EXAMINER: Nguyen; Hiep T.

ATTY-AGENT-FIRM: Blakely, Sokoloff, Taylor & Zafman

ABSTRACT:

A direct memory access (DMA) circuit includes a first register for storing an address for the transfer of data, apparatus for transferring data at sequential addresses beginning at the address in the first register until all data at sequential addresses has been transferred, a second register for storing a beginning address for a list of addresses, and a state machine which responds to the completion of a transfer of data at sequential addresses beginning at the address in the first register and an indication that more data is to be transferred to transfer an address from the list at the address in the second register to the first register and causes the apparatus for transferring data to commence.

19 Claims, 6 Drawing figures

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L5: Entry 7 of 7

File: USPT

Jan 13, 1998

US-PAT-NO: 5708849

DOCUMENT-IDENTIFIER: US 5708849 A

TITLE: Implementing scatter/gather operations in a direct memory access device on a personal computer

DATE-ISSUED: January 13, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Coke; James S.	Cameron Park	CA		
Bhatt; Ajay V.	Eldorado Hills	CA		
Graham; Stan	Cameron Park	CA		
Lent; David	Placerville	CA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Intel Corporation	Santa Clara	CA			02

APPL-NO: 08/ 791008 [\[PALM\]](#)

DATE FILED: January 27, 1997

PARENT-CASE:

This is a continuation of application Ser. No. 08/187,751, filed Jan. 26, 1994, now abandoned.

INT-CL: [06] [G06 F 13/10](#)

US-CL-ISSUED: 395/842; 395/310

US-CL-CURRENT: [710/22](#)

FIELD-OF-SEARCH: 395/842, 395/843, 395/844, 395/845, 395/846, 395/847, 395/848, 395/310

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected

Search ALL

Clear

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	5155830	October 1992	Kurashige	395/844
<input type="checkbox"/>	5175825	December 1992	Starr	395/425
<input type="checkbox"/>	5182800	January 1993	Farrell et al.	395/844
<input type="checkbox"/>	5212795	May 1993	Hendry	395/848
<input type="checkbox"/>	5251303	October 1993	Fogg, Jr. et al.	395/844

<input type="checkbox"/> 5291582	March 1994	Drako et al.	395/425
<input type="checkbox"/> 5333290	July 1994	Kato	395/846
<input type="checkbox"/> 5333294	July 1994	Schnell	395/846
<input type="checkbox"/> 5367639	November 1994	Sodos	395/844

ART-UNIT: 232

PRIMARY-EXAMINER: Chan; Eddie P.

ASSISTANT-EXAMINER: Nguyen; Hiep T.

ATTY-AGENT-FIRM: Blakely, Sokoloff, Taylor & Zafman

ABSTRACT:

A direct memory access (DMA) circuit includes a first register for storing an address for the transfer of data, apparatus for transferring data at sequential addresses beginning at the address in the first register until all data at sequential addresses has been transferred, a second register for storing a beginning address for a list of addresses, and a state machine which responds to the completion of a transfer of data at sequential addresses beginning at the address in the first register and an indication that more data is to be transferred to transfer an address from the list at the address in the second register to the first register and causes the apparatus for transferring data to commence.

19 Claims, 6 Drawing figures

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US006798418B1

(12) United States Patent
Sartori et al.**(10) Patent No.: US 6,798,418 B1**
(45) Date of Patent: Sep. 28, 2004**(54) GRAPHICS SUBSYSTEM INCLUDING A
RAMDAC IC WITH DIGITAL VIDEO
STORAGE INTERFACE FOR CONNECTION
TO A GRAPHICS BUS****(75) Inventors:** Gabriele Sartori, Fremont, CA (US);
Dale E. Gullick, Austin, TX (US)**(73) Assignee:** Advanced Micro Devices, Inc.,
Sunnyvale, CA (US)**(*) Notice:** Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.**(21) Appl. No.:** 09/577,527**(22) Filed:** May 24, 2000**(51) Int. Cl.:** G06F 13/14**(52) U.S. Cl.:** 345/319**(58) Field of Search:** 375/240, 240.27;
345/309, 643, 519, 506, 558, 420, 419,
501, 522, 520, 326/36, 710/26, 312, 305,
200, 56, 22, 52, 701/206, 711/147, 370/263**(56) References Cited****U.S. PATENT DOCUMENTS**

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WO	WO 00/28518	5/2000

OTHER PUBLICATIONSSpecification for ADV478/ADV471, Analog Devices, Inc.,
pp. 1-12

* cited by examiner

Primary Examiner—Matthew C. Bella
Assistant Examiner—Dalip K. Singh*(74) Attorney, Agent, or Firm*—Meyerzon Hood Kivlin
Kower & Goetzal, P.C.; B. Noel Kivlin; Stephen J. Curran**(57) ABSTRACT**

A graphics subsystem including a RAMDAC for connection to a graphics bus implemented on an integrated circuit chip separate from a graphics processor. In one embodiment, the graphics processor is configured to render digital image information in response to graphics commands and to store the digital image information in a memory. The RAMDAC IC includes a conversion unit, which includes a color mapping unit and a digital-to-analog converter and is configured to convert a representation of the digital image information into one or more analog signals for driving a video display. The graphics subsystem further includes a Direct Memory Access (DMA) controller implemented on the second integrated circuit chip. The DMA controller is configured to generate read requests to retrieve the digital image information stored in the memory to thereby cause the digital image information to be provided to the conversion unit. The DMA controller is further configured to generate write cycles to cause digital RGB display data received from the color mapping unit, in the conversion unit, to be provided for storage in a specified region of memory. In another embodiment, the graphics subsystem may include a digital video interface implemented on the second integrated circuit chip. The digital video interface is configured to receive digital RGB display data from the color mapping unit and to provide an encoded digital video output to a digital video output port. The digital video interface is further configured to receive encoded digital video from a digital video input port and to provide decoded digital display data for storage on devices such as a digital VCR.

36 Claims, 9 Drawing Sheets

100

US-PAT-NO: 6798418

DOCUMENT-IDENTIFIER: US 6798418 B1

TITLE: Graphics subsystem including a RAMDAC IC with digital video storage interface for connection to a graphics bus

----- KWIC -----

Brief Summary Text - BSTX (15):

In one embodiment, a graphics processor implemented on a first integrated circuit chip is configured to render digital image information in response to graphics commands and to store the digital image information in a memory. The graphics commands may be received, for example, from a main CPU within a computer system associated with the graphics subsystem. A conversion unit is further provided on a second integrated circuit chip, which includes a color mapping unit and a digital-to-analog converter. The color mapping unit may include a RAM look-up table and is configured to convert the digital image information into digital RGB display data. The digital-to-analog converter is coupled to convert the digital RGB display data into one or more analog signals for driving a video display. The graphics subsystem further includes a Direct Memory Access (DMA) controller implemented on the second integrated circuit chip. The DMA controller is configured to generate read requests to retrieve the digital image information stored in the memory and to thereby cause the digital image information to be provided to the conversion unit. The DMA controller is further configured to generate write cycles to cause the digital RGB display data to be written to a designated region of memory. The operating system may then transfer the digital RGB display data from the memory into a storage device such as a hard disk drive.

Claims Text - CLTX (1):

1. A graphics subsystem comprising: a graphics processor implemented on a first integrated circuit chip, wherein said graphics processor is configured to render digital image information in response to a graphics command received from a CPU and to store said digital image information in a memory; a conversion unit implemented on a second integrated circuit chip, wherein said conversion unit includes a color mapping unit coupled to convert said digital image information to digital RGB display data, wherein said conversion unit further includes a digital-to-analog converter coupled to convert said digital RGB display data to one or more analog signals for driving a video display; and a DMA controller implemented on said second integrated circuit chip, wherein said DMA controller is configured to generate read requests to retrieve said digital image information stored in said memory and to cause said digital image information to be provided to said conversion unit; wherein said DMA controller is further configured to generate write cycles to cause said digital RGB display data to be written to a designated memory region.

Claims Text - CLTX (13):



US006044414A

United States Patent [19][11] Patent Number: **6,044,414****Gulick**[45] Date of Patent: **Mar. 28, 2000**

[54] **SYSTEM FOR PREVENTING A DMA CONTROLLER FROM EVALUATING ITS DRQ INPUT ONCE A DMA OPERATION HAS STARTED UNTIL THE DRQ INPUT HAS BEEN UPDATED**

[75] Inventor: Dale E. Gulick, Austin, Tex.

[73] Assignee: Advanced Micro Devices, Inc., Sunnyvale, Calif.

[21] Appl. No.: 09/024,293

[22] Filed: Feb. 17, 1998

[51] Int. Cl.⁷ G06F 13/14

[52] U.S. Cl. 710/22; 710/241; 710/266;

364/132

[58] Field of Search 710/21, 22, 113, 710/241, 260; 364/132

[56] **References Cited**

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Common Architecture, "Desktop PC/AT systems", Mar. 21, 1996, Version .93 Preliminary, pp. 1-26.

Advanced Micro Devices, "AM7968/Am7969 TAXIchip™ Article Reprints", Jan. 22, 1987, pp. 1-77, particularly pp. 67-72.

National Semiconductor, "PC87306 SuperI/O™ Enhanced Sidewinder Lite Floppy Disk Controller, Keyboard Controller, Real-Time Clock, Dual UART's, Infrared Interface, IEEE 1284 Parallel Port, and IDE Interface", Preliminary—Nov. 1995, pp. 1-110.

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Primary Examiner—Thomas C. Lee

Assistant Examiner—Abdelmoniem Elamin

Attorney, Agent, or Firm—Zagorin, O'Brien & Graham, LLP

[57] **ABSTRACT**

A computer system includes first and second integrated circuits. A direct memory access (DMA) controller circuit on the first integrated circuit receives a direct memory access request (DRQ) input signal which is provided from the second integrated circuit, across a signal line of said bus. The value of the DRQ signal is updated at predetermined intervals on the signal line. A DMA synchronization control circuit on the first integrated circuit prevents the DMA controller circuit from evaluating its DRQ input signal, once a DMA operation has started, until after the value of the DRQ input signal has been updated by the second integrated circuit. In addition, the DMA acknowledge signal from the DMA controller circuit is mapped to an address indicative of the acknowledge signal, and the address is sent to the second integrated circuit. A decoder circuit on the second integrated circuit decodes the address and provides the appropriate DMA acknowledge signal to a functional block on the second integrated circuit according to the address received.

23 Claims, 14 Drawing Sheets

US-PAT-NO: 6044414

DOCUMENT-IDENTIFIER: US 6044414 A

TITLE: System for preventing a DMA controller from evaluating its DRQ input once a DMA operation has started until the DRQ input has been updated

----- KWIC -----

Abstract Text - ABTX (1):

A computer system includes first and second integrated circuits. A direct memory access (DMA) controller circuit on the first integrated circuit receives a direct memory access request (DRQ) input signal which is provided from the second integrated circuit, across a signal line of said bus. The value of the DRQ signal is updated at predetermined intervals on the signal line. A DMA synchronization control circuit on the first integrated circuit prevents the DMA controller circuit from evaluating its DRQ input signal, once a DMA operation has started, until after the value of the DRQ input signal has been updated by the second integrated circuit. In addition, the DMA acknowledge signal from the DMA controller circuit is mapped to an address indicative of the acknowledge signal, and the address is sent to the second integrated circuit. A decoder circuit on the second integrated circuit decodes the address and provides the appropriate DMA acknowledge signal to a functional block on the second integrated circuit according to the address received.

Brief Summary Text - BSTX (15):

One problem associated with such a solution is to ensure that direct memory access information provided to the first integrated circuit is valid. Because of the inherent delay of a serial bus, such information may be invalid when the DMA control circuit expects the information to be valid. Accordingly, the present invention provides a computer system including a first and second integrated circuits which are coupled by a serial bus. A direct memory access (DMA) circuit is on the first integrated circuit and coupled to receive a direct memory access request (DRQ) input signal from the second integrated circuit. The value of the DRQ signal is provided from said second integrated circuit, across a signal line of the bus with the value being updated periodically the signal line.

Brief Summary Text - BSTX (16):

Accordingly, a DMA synchronization control circuit on the first integrated circuit prevents the DMA circuit from evaluating its DRQ input signal until after the DRQ input signal has been updated by said second integrated circuit after a DMA operation. In addition, the DMA acknowledge signal from the DMA controller circuit is mapped to an address indicative of the acknowledge signal, and the address is sent to the second integrated circuit. A decoder circuit on the second integrated circuit decodes the address and provides the appropriate DMA acknowledge signal according to the address received.



US005708849A

United States Patent [19]

Coke et al.

[11] Patent Number: **5,708,849**[45] Date of Patent: **Jan. 13, 1998**

[34] **IMPLEMENTING SCATTER/GATHER OPERATIONS IN A DIRECT MEMORY ACCESS DEVICE ON A PERSONAL COMPUTER**

[75] Inventors: James S. Coke, Cameron Park; Ajay V. Bhatt, Eldorado Hills; Stan Graham, Cameron Park; David Lent, Placerville, all of Calif.

[73] Assignee: Intel Corporation, Santa Clara, Calif.

[21] Appl. No.: 791,808

[22] Filed: Jan. 27, 1997

Related U.S. Application Data

[63] Continuation of Ser. No. 187,751, Jan. 26, 1994, abandoned.

[51] Int. Cl.⁶ G06F 13/10

[52] U.S. Cl. 395/842; 395/310

[58] Field of Search 395/842, 843, 395/844, 845, 846, 847, 848, 310

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 5,367,639 11/1994 Sodos 395/844

Primary Examiner—Eddie P. Chan

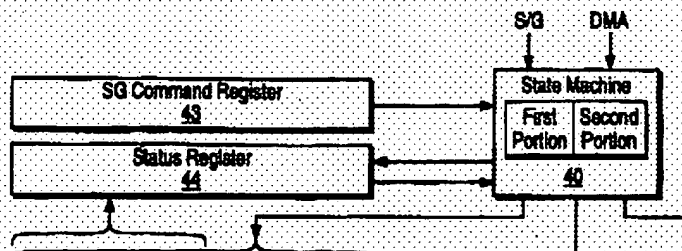
Assistant Examiner—Hiep T. Nguyen

Attorney, Agent, or Firm—Blackly, Sokoloff, Taylor & Zafman

ABSTRACT

A direct memory access (DMA) circuit includes a first register for storing an address for the transfer of data, apparatus for transferring data at sequential addresses beginning at the address in the first register until all data at sequential addresses has been transferred, a second register for storing a beginning address for a list of addresses, and a state machine which responds to the completion of a transfer of data at sequential addresses beginning at the address in the first register and an indication that more data is to be transferred to transfer an address from the list at the address in the second register to the first register and causes the apparatus for transferring data to commence.

19 Claims, 5 Drawing Sheets



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Search Results - Record(s) 1 through 10 of 32 returned.

☐ 1. Document ID: US 20040123013 A1

L3: Entry 1 of 32

File: PGPB

Jun 24, 2004

PGPUB-DOCUMENT-NUMBER: 20040123013

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040123013 A1

TITLE: Direct memory access controller system

PUBLICATION-DATE: June 24, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Clayton, Shawn Adam	Boylston	MA	US	
Fortin, Brian Mark	Hudson	MA	US	
Willie, Daniel Brian	Longmont	CO	US	
Wood, John Leland	Stratham	NH	US	

US-CL-CURRENT: [710/310](#); [710/308](#)

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	RPMC	Draw Desc	Image
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☐ 2. Document ID: US 20040073738 A1

L3: Entry 2 of 32

File: PGPB

Apr 15, 2004

PGPUB-DOCUMENT-NUMBER: 20040073738

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040073738 A1

TITLE: Scalable efficient I/O port protocol

PUBLICATION-DATE: April 15, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kessler, Richard E.	Shrewsbury	MA	US	
Duncan, Samuel H.	Arlington	MA	US	
Hartwell, David W.	Bolton	MA	US	
Webb, David A.J. JR.	Groton	MA	US	
Lang, Steve	Stow	MA	US	

US-CL-CURRENT: [710/308](#); [711/147](#)

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	RPMC	Draw Desc	Image
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☐ 3. Document ID: US 20020166004 A1

L3: Entry 3 of 32

File: PGPB

Nov 7, 2002

PGPUB-DOCUMENT-NUMBER: 20020166004

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020166004 A1

TITLE: Method for implementing soft-DMA (software based direct memory access engine) for multiple processor systems

PUBLICATION-DATE: November 7, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kim, Jason Seung-Min	San Jose	CA	US	

US-CL-CURRENT: 710/22

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 4. Document ID: US 20020161944 A1

L3: Entry 4 of 32

File: PGPB

Oct 31, 2002

PGPUB-DOCUMENT-NUMBER: 20020161944

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020161944 A1

TITLE: Programmable controller

PUBLICATION-DATE: October 31, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Okada, Kazunori	Kyoto		JP	

US-CL-CURRENT: 710/22

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 5. Document ID: US 6874054 B2

L3: Entry 5 of 32

File: USPT

Mar 29, 2005

US-PAT-NO: 6874054

DOCUMENT-IDENTIFIER: US 6874054 B2

TITLE: Direct memory access controller system with message-based programming

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw Desc	Image
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☐ 6. Document ID: US 6865643 B2

L3: Entry 6 of 32

File: USPT

Mar 8, 2005

US-PAT-NO: 6865643

DOCUMENT-IDENTIFIER: US 6865643 B2

TITLE: Communications architecture for a high throughput storage processor providing user data priority on shared channels

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw Desc	Image
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☐ 7. Document ID: US 6813689 B2

L3: Entry 7 of 32

File: USPT

Nov 2, 2004

US-PAT-NO: 6813689

DOCUMENT-IDENTIFIER: US 6813689 B2

TITLE: Communications architecture for a high throughput storage processor employing extensive I/O parallelization

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw Desc	Image
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☐ 8. Document ID: US 6792506 B2

L3: Entry 8 of 32

File: USPT

Sep 14, 2004

US-PAT-NO: 6792506

DOCUMENT-IDENTIFIER: US 6792506 B2

TITLE: Memory architecture for a high throughput storage processor

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw Desc	Image
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☐ 9. Document ID: US 6738836 B1

L3: Entry 9 of 32

File: USPT

May 18, 2004

US-PAT-NO: 6738836

DOCUMENT-IDENTIFIER: US 6738836 B1

TITLE: Scalable efficient I/O port protocol

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw Desc	Image
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☐ 10. Document ID: US 6687796 B1

L3: Entry 10 of 32

File: USPT

Feb 3, 2004

US-PAT-NO: 6687796

DOCUMENT-IDENTIFIER: US 6687796 B1

TITLE: Multi-channel DMA with request scheduling

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	IMC	Draw Desc	Image
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☐ 11. Document ID: US 6502169 B1

L3: Entry 11 of 32

File: USPT

Dec 31, 2002

US-PAT-NO: 6502169

DOCUMENT-IDENTIFIER: US 6502169 B1

TITLE: System and method for detection of disk storage blocks containing unique values

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMNC	Draw Desc	Image
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☐ 12. Document ID: US 6425053 B1

L3: Entry 12 of 32

File: USPT

Jul 23, 2002

US-PAT-NO: 6425053

DOCUMENT-IDENTIFIER: US 6425053 B1

TITLE: System and method for zeroing data storage blocks in a raid storage implementation

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMNC	Draw Desc	Image
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☐ 13. Document ID: US 6363444 B1

L3: Entry 13 of 32

File: USPT

Mar 26, 2002

US-PAT-NO: 6363444

DOCUMENT-IDENTIFIER: US 6363444 B1

TITLE: Slave processor to slave memory data transfer with master processor writing address to slave memory and providing control input to slave processor and slave memory

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMNC	Draw Desc	Image
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☐ 14. Document ID: US 6324598 B1

L3: Entry 14 of 32

File: USPT

Nov 27, 2001

US-PAT-NO: 6324598

DOCUMENT-IDENTIFIER: US 6324598 B1

TITLE: Software enlarged tag register and method thereof for noting the completion of a DMA transfer within a chain of DMA transfers

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMNC	Draw Desc	Image
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☐ 15. Document ID: US 6122699 A

L3: Entry 15 of 32

File: USPT

Sep 19, 2000

US-PAT-NO: 6122699

DOCUMENT-IDENTIFIER: US 6122699 A

**** See image for Certificate of Correction ****

TITLE: Data processing apparatus with bus intervention means for controlling interconnection of plural busses

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw Desc	Image
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☐ 16. Document ID: US 6006286 A

L3: Entry 16 of 32

File: USPT

Dec 21, 1999

US-PAT-NO: 6006286

DOCUMENT-IDENTIFIER: US 6006286 A

TITLE: System for controlling data packet transfers by associating plurality of data packet transfer control instructions in packet control list including plurality of related logical functions

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw Desc	Image
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☐ 17. Document ID: US 5983301 A

L3: Entry 17 of 32

File: USPT

Nov 9, 1999

US-PAT-NO: 5983301

DOCUMENT-IDENTIFIER: US 5983301 A

TITLE: Method and system for assigning a direct memory access priority in a packetized data communications interface device

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw Desc	Image
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☐ 18. Document ID: US 5948080 A

L3: Entry 18 of 32

File: USPT

Sep 7, 1999

US-PAT-NO: 5948080

DOCUMENT-IDENTIFIER: US 5948080 A

**** See image for Certificate of Correction ****

TITLE: System for assigning a received data packet to a data communications channel by comparing portion of data packet to predetermined match set to check correspondence for directing channel select signal

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw Desc	Image
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☐ 19. Document ID: US 5933654 A

L3: Entry 19 of 32

File: USPT

Aug 3, 1999

US-PAT-NO: 5933654

DOCUMENT-IDENTIFIER: US 5933654 A

TITLE: Dynamic buffer fracturing by a DMA controller

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWC	Draw Desc	Image
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☐ 20. Document ID: US 5889480 A

L3: Entry 20 of 32

File: USPT

Mar 30, 1999

US-PAT-NO: 5889480

DOCUMENT-IDENTIFIER: US 5889480 A

TITLE: Full duplex serial codec interface with DMA

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWC	Draw Desc	Image
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Search Results - Record(s) 21 through 30 of 32 returned.

☐ 21. Document ID: US 5881248 A

L3: Entry 21 of 32

File: USPT

Mar 9, 1999

US-PAT-NO: 5881248

DOCUMENT-IDENTIFIER: US 5881248 A

TITLE: System and method for optimizing system bus bandwidth in an embedded communication system

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw Desc	Image
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☐ 22. Document ID: US 5878216 A

L3: Entry 22 of 32

File: USPT

Mar 2, 1999

US-PAT-NO: 5878216

DOCUMENT-IDENTIFIER: US 5878216 A

TITLE: System and method for controlling a slave processor

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw Desc	Image
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☐ 23. Document ID: US 5872940 A

L3: Entry 23 of 32

File: USPT

Feb 16, 1999

US-PAT-NO: 5872940

DOCUMENT-IDENTIFIER: US 5872940 A

TITLE: Programmable read/write access signal and method therefor

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw Desc	Image
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☐ 24. Document ID: US 5852742 A

L3: Entry 24 of 32

File: USPT

Dec 22, 1998

US-PAT-NO: 5852742

DOCUMENT-IDENTIFIER: US 5852742 A

TITLE: Configurable data processing pipeline

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw Desc	Image
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☐ 25. Document ID: US 5835788 A

L3: Entry 25 of 32

File: USPT

Nov 10, 1998

US-PAT-NO: 5835788

DOCUMENT-IDENTIFIER: US 5835788 A

TITLE: System for transferring input/output data independently through an input/output bus interface in response to programmable instructions stored in a program memory

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw Desc	Image
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☐ 26. Document ID: US 5818029 A

L3: Entry 26 of 32

File: USPT

Oct 6, 1998

US-PAT-NO: 5818029

DOCUMENT-IDENTIFIER: US 5818029 A

TITLE: Method and apparatus for connecting PCMCIA cards to computer interfaces

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw Desc	Image
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☐ 27. Document ID: US 5812876 A

L3: Entry 27 of 32

File: USPT

Sep 22, 1998

US-PAT-NO: 5812876

DOCUMENT-IDENTIFIER: US 5812876 A

TITLE: DMA controller which can be controlled by host and local processors

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw Desc	Image
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☐ 28. Document ID: US 5809334 A

L3: Entry 28 of 32

File: USPT

Sep 15, 1998

US-PAT-NO: 5809334

DOCUMENT-IDENTIFIER: US 5809334 A

TITLE: Receive packet pre-parsing by a DMA controller

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw Desc	Image
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☐ 29. Document ID: US 5802327 A

L3: Entry 29 of 32

File: USPT

Sep 1, 1998

US-PAT-NO: 5802327

DOCUMENT-IDENTIFIER: US 5802327 A

TITLE: Device for SCSI expansion

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWC	Draw Desc	Image
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☐ 30. Document ID: US 5598579 A

L3: Entry 30 of 32

File: USPT

Jan 28, 1997

US-PAT-NO: 5598579
DOCUMENT-IDENTIFIER: US 5598579 A

TITLE: System fpr transferring data between two buses using control registers writable by host processor connected to system bus and local processor coupled to local bus

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWC	Draw Desc	Image
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File: USPT

May 30, 1995

US-PAT-NO: 5420984

DOCUMENT-IDENTIFIER: US 5420984 A

**** See image for Certificate of Correction ****

TITLE: Apparatus and method for rapid switching between control of first and second DMA circuitry to effect rapid switching between DMA communications

DATE-ISSUED: May 30, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Good; Christopher J.	St. Briavels			GB
Nordman; Joseph M.	West Bend	WI		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Genroco, Inc.	Slinger	WI			02

APPL-NO: 08/ 106186 [\[PALM\]](#)

DATE FILED: August 13, 1993

PARENT-CASE:

This application is a continuation of application Ser. No. 07/906,911, filed Jun. 30, 1992, now abandoned.

INT-CL: [06] [G06 F 3/00](#)

US-CL-ISSUED: 395/275; 395/250, 395/425, 364/242.31, 364/DIG.1

US-CL-CURRENT: [710/22](#); [709/212](#), [710/27](#), [710/28](#)

FIELD-OF-SEARCH: 395/250, 395/278, 395/425, 364/200

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

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PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> 4032899	June 1977	Jenny et al.	364/200
<input type="checkbox"/> 4246637	January 1981	Brown et al.	364/200
<input type="checkbox"/> 4298954	November 1981	Bigelow	364/900
<input type="checkbox"/> 4475155	October 1984	Oishi et al.	364/200
<input type="checkbox"/> 4571674	February 1986	Hartung	364/200
4819203	April 1989	Shiroyanagi et al.	364/900

4965801

October 1990

DuLac

371/40.1

5150465

September 1992

Bush et al.

395/275

5193149

March 1993

Awiszio et al.

395/200

5195089

March 1993

Sindhu et al.

370/85.1

5276842

January 1994

Sugita

395/425

5297260

March 1994

Kametani

395/325

ART-UNIT: 237

PRIMARY-EXAMINER: Shin; Christopher B.

ATTY-AGENT-FIRM: Quarles & Brady

ABSTRACT:

A method and apparatus for improving sustainable data throughput between a host system minicomputer and a plurality of peripheral memories utilizes a dual-ported RAM memory, a microelectronic processor with an instruction rate of 10 MIPS or greater and task switching firmware executed by the microelectronic processor for rapid switching between communication on a peripheral data bus to the peripheral memories and communication on a system data bus having a relatively higher data rate. Also disclosed is a method of data caching on the host system using the peripheral controller.

6 Claims, 3 Drawing figures

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